220122

BEFORE

THE PUBLIC SERVICE COMMISSION OF

SOUTH CAROLINA

DOCKET NO. 2008-447-EG – ORDER NO. 2009-_____

NOVEMBER ....., 2009

IN THE MATTER OF:

Petition to Establish Docket to Consider Implementing the Requirements of:	)	Proposed
	)	**ORDER No. 2009-_____**
Section 1307 (State Consideration of Smart Grid) of the Energy Independence and Security Act of 2007.	)	

CONTENT

Proposed Order was written by Joseph E. Wojcicki and submitted on November 3, 2009

I. INTRODUCTION.

The matter comes before the Public Service Commission of South Carolina (the "Commission") on the Office of Regulatory Staff ("ORS") Petition to Establish Docket to Fulfill the State Requirements of the Energy Independence & Security Act of 2007 ("EISA") which was filed with Commission on .December 12, 2008 as well as another ORS Amended Petition filed with Commission on February 2, 2009.

ORS seeks Commission to consider matters as required by Section 1307 and additionally Section 532 of EISA.

On December 19, 2007, President Bush signed the EISA

The EISA requires state commissions to consider energy efficiency resources and smart grid investments with respect to each electric and gas utility for which the state commission has ratemaking authority.

Section 1301 of EISA and 42 U.S.C.A. § 17381, Statement of policy on modernization of electricity grid. It is the policy of the United States to support the modernization of the Nations electricity transmission and distribution system to maintain a reliable and secure electricity infrastructure that can meet future demand growth and to achieve each of the following which together characterize a Smart Grid:

(1) Increased use of digital information and controls technology **to improve reliability, security, and efficiency of the electric grid**.

(2) Dynamic optimization of **grid operations and resources, with full cyber-security**.

(3) Deployment and integration of distributed resources and generation, including renewable resources.

(4) Development and incorporation of demand response, demand-side resources, and energy-efficiency resources.

(5) Deployment of "smart" technologies (real-time, automated, interactive technologies that optimize the physical operation of appliances and consumer devices) for metering, communications concerning grid operations and status, and distribution automation.

(6) Integration of "smart" appliances and consumer devices.

(7) Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles, and thermal-storage air conditioning.
(8) Provision to consumers of timely information and control options.
(9) Development of standards for communication and interoperability of appliances and equipment connected to the electric grid, including the infrastructure serving the grid.
(10) Identification and lowering of unreasonable or unnecessary barriers to adoption of smart grid technologies, practices, and services.

Section 1307 of EISA7entitled "State Consideration of Smart Grid" requires the Commission not later than one year after the enactment of EISA (by December 19, 2008) to set a hearing date or commence the consideration referred to in paragraphs 6 through 9 below with regards to each electric utility for which ratemaking authority.

Section 1307(a) (16) (A) of EISA requires the Commission to consider requiring an electric utility of South Carolina for which it has ratemaking authority to demonstrate that the utility considered an investment in a "qualified" **smart grid system based on appropriate factors prior** to undertaking investments in non advanced grid technologies. Factors in consideration for a qualified smart grid system include total costs, cost-effectiveness, improved reliability, security, system performance and societal benefit.

Section 1307(a) (16) (B) requires the Commission to consider authorizing each electric utility for which it has ratemaking authority to recover from ratepayers any capital, operating expenditure, or other costs of the electric utility relating to the deployment of a qualified smart grid system, including a reasonable rate of return on the capital expenditures for the deployment of the qualified smart grid system.

Section 1307(a) (16) (C) requires the Commission to consider authorizing any electric utility for which it has ratemaking authority to deploy a qualified smart grid system to recover in a timely manner the remaining book-value costs of any equipment rendered obsolete by the deployment of the qualified smart grid system, based on the remaining depreciable life of the obsolete equipment.

Section 532(a)(16) and (17) of EISA amends 16 U.S.C. § 2621(d)9 by establishing federal standards for electric utilities for integrated resource planning and rate design modifications to promote energy efficiency investments. With respect to integrated resource planning, electric utilities are to incorporate energy efficiency resources and adopt policies establishing cost-effective energy efficiency. With respect to rate design modifications to promote energy efficiency investments, electric utilities are to align utility incentives with the delivery of cost-effective energy efficiency and promote energy efficiency investments. Section 532(a) (17) (B) further states each state regulatory authority shall consider:

(i) removing the throughput incentive and other regulatory and management disincentives to energy efficiency;

(ii) providing utility incentives for the successful management of energy efficiency programs;

(iii) including the impact on adoption of energy efficiency as one of the goals of retail rate design, recognizing that energy efficiency must be balanced with other objectives;

(iv) adopting rate designs that encourage energy efficiency for each customer class;

(v) allowing timely recovery of energy efficiency-related costs; and

(vi) offering home energy audits, offering demand response programs, publicizing the financial and environmental benefits associated with making home energy efficiency improvements, and educating homeowners about all existing Federal and State incentives, including the availability of low-cost loans, that make energy efficiency

improvements more affordable. It should be noted that S.C. Code Ann. § 58-37-40, enacted in 1992, establishes integrated resource plans for electrical utilities. It should also be noted that S.C. Code Ann. § 58-37-20, enacted in 1992, allows the Commission to adopt procedures that encourage electrical utilities to invest in cost-effective energy efficient technologies and energy conservation programs.

Section 532(b) (5) and (6) applies to natural gas utilities. Section 532(b) (5) of EISA, amending 15 U.S.C. § 3203(b), states each natural gas utility shall integrate energy efficiency resources into the plans and planning processes of the natural gas utility; and adopt policies that establish energy efficiency as a priority resource in the plans and planning processes of the natural gas utility. Section 532(b)(6) of EISA, amending 15 U.S.C. § 3203(b), states the rates allowed to be charged by a natural gas utility shall align utility incentives with the deployment of cost-effective energy efficiency. With respect to natural gas rates and cost effective energy efficiency, each state regulatory authority is to consider:

(i) separating fixed cost revenue recovery from the volume of transportation or sales service provided to the customer;

(ii) providing to utilities incentives for the successful management of energy efficiency programs, such as allowing utilities to retain a portion of the cost-reducing benefits accruing from the programs;

(iii) promoting the impact on adoption of energy efficiency as one of the goals of retail rate design, recognizing that energy efficiency must be balanced with other objectives; and

(iv) adopting rate designs that encourage energy efficiency for each customer.

The document called Stipulation was filled on September 10, 2009.

This Stipulation ("Stipulation" or "Agreement") was made by and among the South Carolina Office of Regulatory Staff ("ORS"); Piedmont Natural Gas ("PNG"); Lockhart Power Company ("Lockhart"); Progress Energy Carolinas, Inc. ("Progress"); Duke

Energy Carolinas, LLC ("Duke"); and South Carolina Electric & Gas Company ("SCE&G") (collectively referred to as the "Parties" or sometimes individually as a "Party"). In their Stipulation Party:

"*1. The Parties agree to stipulate into the record before the Commission the direct testimony and exhibits of the following fourteen (14) witnesses without objection, change, amendment or cross-examination with the exception of changes comparable to those which would be presented via an errata sheet or through a witness noting a correction.*

(i) ORS witnesses:

1. M. Anthony James

2. Carey M. Flynt

(ii) PNG witness:

1. PiaK.Powers

(iii)Lockhart witness:

1. Bryan D.Stone

(iv)Progress witnesses:

1. LauraA.Bateman

2. Rebecca S. Harrison

3. B. Mitchell Williams

(v) Duke witnesses:

1. Jeffrey R. Bailey

2. Donald H. Denton, III

3. Jane L. McManeus

4. Robert A. McMurry

5. Richard G. Stevie, Ph.D

(vi) SCE&G witnesses:

1. Julius A. Wright, Ph.D

2. Randal M. Senn

2. The Parties agree that the standards set forth in EISA and the subject of this

docket should not be adopted as such standards have already been adopted and encouraged by the Commission, and therefore no action by the Commission is required at this time.

3. The Parties further agree that it would not be in the best interest of the Parties or customers for a specific standard, particularly a rate design standard, to be adopted and uniformly applied to all South Carolina investor-owned utilities.

4. Accordingly, the Parties agree that if the Commission finds its current processes, which comport with EISA standards, should be amended or that the standards should receive further consideration, the Parties agree that such standards should be addressed on a company by company basis to allow flexibility.

5. The Parties agree this Stipulation is reasonable, in the public interest and in accordance with law and regulatory policy.

6. ORS is charged with the duty to represent the public interest of South Carolina pursuant to S.C. Code §58-4-10(B) (Supp. 2008). S.C. Code §58-4-10(B)(l) through (3)..."

The hearing took place in PSC Hearing Room on September 22, 2009 @ 10:30 AM

Witnesses formed four panels.

As a result of the cross-examination only part of Stipulation that applied to methods used in accounting could be covered still by existing procedures in ORS and PSC processing.

None of the electric energy generation and distribution systems, i.e. modern grid problem may be reviewed and approved by both South Carolina authorities without proper amendments as suggested in EISA. Smart networking also required new approach in the process of verification by ORS and the Commission (PSC)

II. FINDINGS OF FACTS.

1. The Big North America Outages in 2003 revealed problems in electric grid that brought fundamental suggestions in EISA. All 10 points of Smart Grid listed in ORS Petition must be respected by any, necessary amendments to procedures conducted by SC ORS and PSC.
2. EISA Smart Grid aspects # 1 and #2 specifically were not reviewed satisfactory at the hearing.
3. The Stipulation has only bald statements and there are no any scientific arguments to support its suggestion "to do nothing".
4. Outages in South Carolina (SC) have no statistics of losses in all electric utilities being present at the hearing. SC Steel Industry did not deliver any statistics too, even they are paying millions for electricity. There was no indication of tariff or contractual relief to the SC industry or other users for the interrupted power or undelivered kWh.
5. None of witnesses could answer questions about energy quality, protections in smart grid, and other questions coming from EISA directive analysis.
6. The cross-examination was stopped at the point when no answers were given to the serious technical questions.
7. Present procedures to verify financial numbers could be adequate to new system for Smart Grid as calculation tools but cannot ignore other factors including national security.
8. The location of South Carolina in the USA territory forces all its regulatory authorities to add new criteria of the technical document verification, especially in

electric energy production and distribution via national smart grid. In the future SC will be almost in the center of energy and transportation corridor from Miami to Canada at the America's Atlantic – East Coast.

9. None of the pipeline safety problems was covered in any of testimonies and in Stipulation.
10. Federal grants for Smart Grid which will be delivered as a part of the American Reinvestment and Recovery Act must accelerate our work on regulatory requirements in a new, at least additional two-stage, verification process. SC unemployment rate maybe significantly lower by new job created from the federal grants.

III, LOGICAL AND TECHNICAL ANALYSIS FOR THE PURPOSE OF THIS ORDER.

1. Here we start with detailed review of first three Smart Grid aspects cited by ORS from EISA:

"(1) Increased use of digital information and controls technology to improve reliability, security, and efficiency of the electric grid.

(2) Dynamic optimization of grid operations and resources, with full cyber-security.

(3) Deployment and integration of distributed resources and generation, including renewable resources."

2. The following analysis will consider already known facts of grid malfunctions and today's technical knowledge in this field of technology and science.

3. Digital information and controls technology are to improve reliability. The most important part of electric energy reliability is its availability - almost always. Any of submitted projects/applications to the Commission must be checked for this aspect very carefully. The adequate verification of submitted documents requires very strong technical level and more than one stage of the verification. Documentation troubleshooting requires also more than one expert to do the verification. Very high cost of outages cannot be ignored in any suggested risky solutions and with, of course, possible wrong assumptions in the project designers, company management and possible single expert's error or by overlooking any, even hidden errors before a final approval. The present situation of lack of serious statistics of already noted grid malfunctions and outages in all utilities being present in the hearing indicates this fact as a one of serious point of interest in the future verification process. Just this one aspect requires rework of existing criteria in ORS and Commission approach to the process of verification and approving or denying any of energy projects including Smart Grid ones. Some publication estimate up to $150 billion annual losses caused by outages in the USA.

4. Digital information and controls technology are to improve security. The required level of security increases almost exponentially with the size of a grid. Interconnections of sub- grids are the examples where possible multi-directional energy transmissions increase necessity for reconsideration of the grid protections. The example of 2003 Big North American Outages with estimated losses of about $6 billions revealed several errors in the protection, failure of fast

information links, etc. The event on 9-11-2001 sent also a strong signal of necessary development and extension of detailed review the national security aspects in existing systems as well as in each new project.

5. Digital information and controls technology are to improve efficiency of the electric grid. First, we have to see the electric grid as a distribution system of the electricity (as a kind of the product of other form of energy conversion process). This is a little simplifier definition so verification must be done with deeper analysis. All the factors of electric power & energy quality apply also to the economic efficiency. The process of verification must also check and set necessary requirements to the grid and, as stated at the beginning of this paragraph, to the smart networks monitoring and controlling the grid.
6. Dynamic behavior of large-scale technical systems in the grid is in the very small time periods. From microseconds in the case of lightning, milliseconds of fast acting protections to minutes of overload and self-healing. Electromechanical and electromagnetic phenomena in this world have basic influence in designing then installing and maintaining grid. Modern smart network solutions may improve and stabilize the work of the grid but must be carefully verified and compare to the national regulations and electrical standards. Big NA Outages case showed that grid, in its designing, is not self-regulatory system. Some similarity Americans may find in our banking systems now.
7. Dynamic optimization must be strict coordinated with cyber security protection means. Disturbances may be injected to smart grid from nature as well by technical malfunctions, operators' negligence, sabotage and terroristic attacks.

Many of experiences from Internet dictate extremely precautions in accepting new solutions/projects. Some of them will require series of tests, simulation, etc. To prove internal immunity / intrinsic safety and highest level of protections it is required to set short terms of retesting after the installation. This aspect extends responsibility of designers and even higher responsibility of verifiers including SC ORS. Of course, verifiers must have all necessary tools and sources to conduct the verification process to present successfully results to Commission with full documentation, and warranty of foolproof protections. None of the hazard maybe ignored: from solar wind to nuclear electromagnetic pulse, from tornadoes and hurricanes to earthquakes, from lightning strikes to explosions, from children kites on overhead lines to viruses injected into smart grid data systems.

8. All above themes of verification must be done for the grid with new deployment and integration of distributed resources and generation, including renewable resources.

9. All the above have basic and significant affect on the rest items (4 to 10). Especially they have significant value for large energy users that are supporting State tax revenue and its job market

10. State of South Carolina will be a central location for the future of the USA East Coast energy transfer corridor increasing its importance in entire national economy. In any of hurricane seasons, nobody can exactly predict the hurricane landing in our East Coast. Everybody can predict that local electricity generating stations will be disconnected, and other regions will deliver electricity. This

requires South – North High Voltage – High Power lines along the coastline. Central location of SC suggests to become a logical place to install a Center of Electric Energy Dispatching. SC Commission must have all necessary economical and technical information that apply to the state future economy, grid system performance and societal benefit. E.g. a plan for Jasper Ocean Terminal with cooperation with Georgia, or Duke plans in SC and NC.

11. Commission shall expect that also technical information to be verified by ORS with full respect to electric energy production, its quality, security, safe distribution and smart organization science. Specifically, the ORS has sole responsibility for the inspection, auditing, and examination of public utilities. ORS is charged with representing the public interest of SC. in utility regulation.

12. The above apply to natural gas pipelines and mains in the cities.

13. According to the White House, "President Barack Obama is announcing $3.4 billion in grants to help build the smart grid. The grants will provide up to $200 million to 100 companies, utilities, manufacturers, cities and other partners in 49 states. The White House intends to pump this money into the economy quickly, with the funds expected to be in company accounts within 60 days. The projects will last 12 to 36 months. The $3.4 billion in Smart Grid Investment Grant awards are part of the American Reinvestment and Recovery Act, and will be matched by industry funding for a total public-private investment worth over $8 billion. Applicants state that the projects will create tens of thousands of jobs, and consumers in 49 states will benefit from these investments in a stronger, more reliable grid.

IV. REQUIREMENTS FOR VERIFICATION LEVELS OF NEW APPLICATIONS TO BE SUBMITTED by COMPANIES, UTILITIES, MANUFACTURERS, CITIES AND OTHER PARTNERS BEING UNDER ORS and COMMISSION SUPERVISION.

1. The importance of grid security and smart solutions of all aspects described in this Order findings and analysis shall be very professionally reviewed before a final decision about verification scope by the Commission will be published.
2. Importance of EISA directives, especially for SC central location inside US East Coast grid shall be fulfilled in strong verification process by ORS as well as SC PSC ("Commission") levels.
3. Beside existing organizational structure of ORS and their responsibilities for SC public, economy and security interest, the new aspect of very serious verification process shall be emphasis including electric power generation and distribution in the smart way for North America existing and future grid.
4. Commission shall receive materials from ORS .verification in such level of professional expertise and independence to avoid any errors in the decision. Commission understands that national security, smart grid new approach to electricity as a product required highest quality and its distribution system (grid) importance of reliability, shall lead to additional criteria in the due process and additional levels of verification any of utilities and others applications.

Now, therefore, IT IS HEREBY ORDERED:

5. Commission is ordering ORS to submit an elaboration about the verification level and its organization for review and approval in following, next stage,

till..... . The elaboration shall accomplish the improvement of entire process, according to extended analysis of EISA. The basic (first) part of the elaboration may have an initial name: The Smart Grid Code ("Code"). Some of paragraphs/articles shall cover:

5.1 Forms of regulations and responsibilities of parts in the verification process.

5.2 Flow chart of the verification process.

5.3 The methods and procedures to update Code.

5.4 All aspects of electrical power / energy quality for regional generation plants and distribution system with respect to national grid efficiency and security.

5.5 Internal security protections. Responsibility of designers, operators and company management.

5.6 Rules of cooperation of all sub-grids.

5.7 .Dynamics controls in the time of disturbances, synchronization lost, etc.

5.8 Interconnecting power plants, transmission systems and consumers. Very fast, fast and slower smart decision methods and techniques.

5.9 Rules of energy exchange in the stable conditions. Efficiency management.

5.10 Rules of zoning, categorizing of loads, cases of overruling, etc.

5.11 Levels of controls.

5.12 Systems and technology of self-healing; their procedures.

5.13 Necessary rules and technology coming from the North America's Grid.

5.14 Rules for Supervisory Control And Data Acquisition (SCADA). Permits and regulations coming from National Grid Center.

5.15 Scope of verification of gas pipelines and distribution in cities with emphasis on safety, coordination with electrical systems, groundings, etc.

5.16 Existing rules from actual ORS procedures.

6. In the ORS verification level, documents shall provide a protocol of organization of expert panels.

7. ORS panel or group of verifiers shall have at least three independent experts. ORS will establish till..... following:

7.1 Rules of setting the bank of Smart Grid Experts ("Expert Bank").

7.2 Rules for candidates to the Expert Bank.

7.3 Rules to add to and remove names from the Expert Bank.

7.4 Rules to appointing each of, at least, three experts to the verification an application/project, and other tasks.

7.5 Describe basic ethics.

7.6 Describe minimum education.

7.7 Describe minimum expertise and a general knowledge of economics of the SE region with its SC central function. Establish criteria of testing a candidate.

7.8 Strict definition and tests for independence.

7.9 By laws in this subject.

7.10 Other aspects ORS will find appropriate to the scope of existing and amended rules, procedures and regulations to cover grid and smart grid areas.

8. ORS shall organize the Expert Bank (list of experts) and reveal their names to utilities and other interesting parties including these representing the public interest.
9. ORS shall submit their project of the scope of the verification levels to final Commission decision. Beside financial aspect, first amendments shall seriously focus on grid aspects listed in EISA with electric energy generation, grid protections and information + control network.
10. According to the White House, "President Barack Obama is announcing $3.4 billion in grants to help build the smart grid. The White House intends to pump this money into the economy quickly. This new aspect shall accelerate this Order realization.
11. The Order shall remain in full force and effect until further order of the Commission.

BY ORDER OF THE COMMISSION:

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Elizabeth B. Fleming, Chairman

ATTEST:

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Above was prepared by Joseph E. Wojcicki and submitted on November 3, 2009

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